to power the load at the partial power especially in the case of an application involving the powering of an electronic component. This is well known in the art as set forth in Dr. Christie's declaration, attached hereto, that indicates a demand for hydrogen supply systems that are used in polymer electrolyte membrane-type fuel cells in which the fuel cell is operated during scheduled maintenance purposes in order to maintain the membrane in a hydrated condition. In this regard, it is the supply system that is the subject of the claims at issue and not the fuel cell itself and further, as indicated by Dr. Christie's declaration such operation of fuel cells are well known in the art. Consequently, Applicants submit that one skilled in the art would readily know how to make and use the subject invention and the best mode for carrying out the same is clearly set forth in the subject invention.

The Examiner next rejected claims 1-10 under 35 U.S.C. §112, second paragraph as being indefinite. In this regard, the Examiner states that claim 1 recites the limitation, "the fuel cell consuming part of the hydrogen" in line 2. In the Examiner's view there is insufficient antecedent basis for this limitation. Applicants traverse this part of the rejection by stating that the proceeding passage is, "a hydrogen storage system for supplying hydrogen to a fuel cell." The next passage is the fuel cell consumes part of the hydrogen. Since both the fuel cell and the hydrogen have been previously mentioned, there therefore exists sufficient antecedent basis for this limitation in the claim.

The Examiner next states since claim 1 recites both "the fuel cell consuming part of the hydrogen", in line 2 and "a further part of the hydrogen", in line 4, it is unclear what specific part Applicants intend to recite in line 7. Applicants traverse this part of the rejection in that obviously the hydrogen supply system supplies part of the hydrogen for load powering purposes and a further part of the hydrogen to operate the fuel cell on the scheduled maintenance basis. Hence, Applicants submit that again there is sufficient antecedent basis of the claim and that further,

the claim is sufficiently clear and distinctly points out the subject matter that Applicants regard as their invention.

The Examiner rejected claims 1-5 and 7-10 under 35 U.S.C. §102(e) as being anticipated by Shabana et al. 2004/0018632.

With respect to independent claim 1, Shabana et al. does not disclose a main hydrogen storage site, an auxiliary hydrogen storage site or a manifold having a flow control network to allow a fuel cell to draw hydrogen from the auxiliary hydrogen storage site to maintain a polymer membrane in a hydrated condition without utilization of the hydrogen from the main hydrogen storage site and consequently, Shabana et al. does not anticipate claim 1.

Independent claim 7 calls for supplying part of the hydrogen to the fuel cell to generate electricity to power the load from a main hydrogen storage site and a further part of the hydrogen on a scheduled basis from an auxiliary hydrogen storage site and periodically renewing the auxiliary hydrogen storage site so that it remains charged to allow the fuel cell to operate on the scheduled basis without drawing hydrogen from the main hydrogen storage site. Applicants submit that Shabana et al. discloses none of such features and therefore, does not anticipate claim 7.

Shabana et al. discloses a hydrogen processing unit 30 which is configured to selectively receive hydrogen gas from, either a compressed gas source, a liquid hydrogen source or a solid hydrogen source, but not all at once. In other words, hydrogen processing unit 30 is configured to be flexible to utilize hydrogen from any one of such sources. As indicated in paragraph 24 thereof, "Therefore for example the hydrogen processing unit 30 may be installed as part of a fuel cell system 10 in a vehicle. As developments occur in the design, manufacturing and use of different forms of hydrogen storage media, the original installed hydrogen storage media may be removed from the vehicle and replaced by a different type of hydrogen storage media which includes hydrogen stored in a different state". Thus, it is apparent that Shabana et al. envisions that compressed

gas utilized in containers 40 and 42 would be used or alternatively, if a hydrogen source utilizing hydrates became practical, the same would replace the compressed gas as a source of hydrogen. As such, it does not have as called for in claim 1, a manifold having a flow control network to allow a fuel cell to draw hydrogen from the auxiliary hydrogen storage site without utilization of the hydrogen from the main hydrogen storage site given the fact that all of the alternatives would not be connected all at once and even if the same were so connected, then the hydrogen would simultaneously be drawn from all the sources. Furthermore, Shabana et al. does not encompass a method as recited in claim 7 in which an auxiliary hydrogen storage site is periodically renewed, so that hydrogen is not consumed from the main hydrogen storage site.

Taking the Examiner point by point in the rejection, the Examiner states that Shabana et al. discloses a hydrogen processing unit for attachment between a fuel cell stack or stacks and a hydrogen storage media namely, a plurality of hydrogen storage media. However, as indicated above, Shabana et al. does not contemplate that the different hydrogen storage media could be used at the same time, but rather, that only one of a number of different types of storage media would be used as the same became available.

The Examiner states that the hydrogen storage includes a hydrogen pressure regulator and other ancillary equipment to enable selective attachment of the hydrogen storage media in different forms including compressed gas. However, the pressure regulator illustrated in Shabana et al., namely, hydrogen pressure regulator 36, is a throttle valve that simply drops a pressure to the desired stack pressure such as 10 bars to provide 1.3 to 3 bars to the hydrogen fuel stacks. It does not allow hydrogen to be used from one type of hydrogen storage media before hydrogen is drawn from another type of hydrogen supply media.

The Examiner states that what Shabana et al. discloses in Figure 2 is that the fuel cell system includes three compressed gas storage tanks

112, 114 and 116 connected to a common manifold 118 for delivery of hydrogen processing unit 130 at a desired pressure temperature, humidity and purity to fuel cell stacks 120. Thus, Shabana et al. at once envisions a flow control network to control hydrogen flow distribution. However, this is simply not correct and there is no implication in this patent application that such flow control network would control hydrogen flow distribution. In the illustration, the compressed gas storage media 112, 114 and 116 commonly feed the hydrogen processing unit. Consequently hydrogen would be drawn from all of the compressed gas cylinders at once. This would be different than in claim 1, for example, that calls for a main hydrogen storage site to contain part of the hydrogen for the fuel cell to generate the predetermined electrical power and an auxiliary hydrogen storage site to contain the further part of the hydrogen to allow the fuel cell to operate on a scheduled basis and a manifold having a flow control network to allow the fuel cell to draw the hydrogen from the auxiliary hydrogen storage site to maintain the polymer membrane in the hydrated condition without utilization of the hydrogen from the main storage site. In Shabana et al. hydrogen would be drawn from all the gas cylinders at the same time given its common connection to the hydrogen processing unit.

The Examiner goes on to state that Figure 1 illustrates a fuel cell system incorporating a hydrogen processing unit which is selectively connectable to a variety of hydrogen storage media, namely 40, 42, 46, 50 and 52. However, given the disclosure of Shabana et al., hydrogen storage media (compressed gas) 42 and 40 would be used at the same time. If hydrogen storage media 46 in a liquid were available it could be used in place of the compressed gas storage media. Consequently, Shabana et al. does not disclose a hydrogen supply system that contains a control network to allow the fuel cell to draw hydrogen from the auxiliary hydrogen storage tank...without utilization of hydrogen from the main hydrogen storage site. Again, neither claims 1 or 7 are anticipated by the Examiner's rejecting combination.

With respect to claims 2 and 8, the Examiner states that the use of a pressure regulator/throttle valve is taught. However, claim 2 not only calls for a pressure regulator, but rather, the pressure regulators that are configured such that hydrogen from the auxiliary hydrogen storage site is delivered to the outlet before the hydrogen stored in the main storage site and furthermore, there are no check valves to prevent the flow of hydrogen between the main and auxiliary hydrogen storage site. Consequently, claim 2 is likewise not anticipated. Claim 8 recites that the manifold has check valves to prevent the flow from the auxiliary hydrogen storage site to the main hydrogen storage site and the use of differential pressures to ensure that the hydrogen from the auxiliary site is drawn before that of the main hydrogen storage site. This feature is completely absent from Shabana et al. and as such claim 8 is likewise not anticipated.

Claim 3 calls for the main hydrogen storage site to consist of two banks of compressed gas cylinders and the auxiliary hydrogen storage site to be a single compressed gas cylinder. At this point, the Examiner states that Figure 2 of Shabana et al. shows each storage media for hydrogen gas and as evident from Figure 1 the fuel cell system includes a variety of different hydrogen storage media in that Shabana et al. discloses that the installed hydrogen storage media may be removed therefrom and replaced by a different type of storage media which includes hydrogen stored in a different state such as a gas without modification of the hydrogen processing unit. While this is correct, what is not disclosed in Shabana et al. is a main hydrogen storage site that consists of two banks of compressed gas cylinders and an auxiliary hydrogen storage site that is a single compressed gas cylinder.

The Examiner goes on to state that Shabana et al. depicts in Figure 2 the fuel cell system including three compressed gas hydrogen storage tanks 112, 114, 116 connected to a common manifold 118 for delivery to a hydrogen processing unit 130 at a desired pressure, temperature, humidity and purity. In the Examiner's view thus Shabana et al. envisions a flow

control network. However, this is not correct in that all that is disclosed is a flow control network that commonly links three gas cylinders and a heat exchanger to a pressure regulator to reduce the pressure of the gas being dispensed from the three gas cylinders.

The Examiner states that Shabana et al. discloses that the originally installed hydrogen storage media may be removed and replaced by a different type of hydrogen storage media. Applicants agree with this. What Applicants do not agree with is that therefore Shabana et al. envisions that hydrogen storage media 46, 50 and 52 can be replaced by compressed gas tanks and accordingly Shabana et al. at once envisions the use of five compressed hydrogen gas tanks as a hydrogen storage media which are either connected to a common manifold or connected to an uncommon manifold. However, this is not correct in that all Shabana et al. envisions and explicitly discloses either the three tank compressed gas system could be used or if liquids were more practical liquids could be used and etc. It does not disclose the use of five compressed hydrogen gas tanks. While Shabana et al. may disclose a pressure harmonization of each of the hydrogen storage media, Shabana et al. does not disclose as recited in any of the claims the use of a manifold having a flow control network to allow the fuel cell to draw hydrogen from the auxiliary hydrogen storage site and maintain the polymer membrane in a hydrated condition without utilization of the hydrogen from the main hydrogen storage site. On this point, Shabana et al, for instance, does not disclose the use of hydrogen storage media 46 and 48 at the same time as hydrogen storage media 46 is used or hydrogen storage media 50 or 52 are used. Consequently, claim 3 is likewise not anticipated.

Claim 4, that depends on claim 3, calls for first, second, and third regulators associated with the single auxiliary compressed gas cylinder and the two banks of gas cylinders for control of flow. This feature is not even arguably disclosed in Shabana et al. given its single pressure regulator. Claim 5, that differs from claim 4 in that the two banks of

compressed gas cylinders commonly feed the manifold and as such there are only first and second pressure regulators, the first being for the auxiliary source and the second for the two banks. As such, claim 5 is likewise not anticipated by Shabana et al.

As to claims 9 and 10 the Examiner contends that periodic removal and replacement of the hydrogen storage media is contemplated. This is incorrect in that storage media illustrated in Shabana et al. is not periodically removed in the manner claimed in claims 9 and 10. The auxiliary storage site is a single compressed gas cylinder which is renewed by periodically replacing the single compressed gas cylinder. Applicants submit that Shabana et al. does not have an auxiliary storage site as called for in either the apparatus and method claims and the mere replacement of the hydrogen storage media a different type of storage media the same becomes either available or practical as contemplated by Shabana et al. is not the periodic replacement storage media. In fact, practically in Shabana et al. what would occur is that when the compressed gas from the compressed gas cylinders were depleted, the compressed gas cylinders would be periodically charged. As such, Applicants submit that claims 9 and 10 are likewise not anticipated.

The Examiner rejected claims 1-5 and 7-10 as being unpatentable over Shabana et al. in view of Fairlie et al. and for reasons mentioned above, Applicants submit that Shabana et al. does not disclose any of the features recited in claims 1-5 and 7-10. Moreover, Fairlie et al. adds nothing that would render the invention in claims 1 and 7 unpatentable. Fairlie et al. discloses in Figure 1 a distribution network in which users 16 file demands for hydrogen. Upon receipt of the demand, a controller 14 determines the nature of the demand with respect to the amount of hydrogen requested as well as other parameters. Upon receiving a demand the controller 14 determines the availability of energy resources 12 to which it is interconnected. Controller 14 further determines the status of all hydrogen producing sources 10, namely, electrolysis units.

Controller 14 then initiates the starting sequence for the hydrogen production sources to meet the demands of user 16 subject to the availability of the energy resources 12 at the lowest possible cost. With additional reference to Figure 2, an energy network is disclosed having a plurality of hydrogen fuel generating electrolyzers 10 that are connected to corresponding user facilities storage 16. Electrical energy is provided to cells 10 by lead 18 on demand, individually or collectively from power grid source 22. Controller 14 receives information from cells 10 and user's facility 16 and the fuel requirement and loading situation. Controller 14 further effects activation of the required electrical feed to cell 10 for hydrogen generation as required. The time of commencement, duration and electrical power levels are also controlled by controller 14. Consequently, hydrogen can be distributed to a plurality of users or storage sites from an electrolyzer, for example, that shown in Figure 1 or each user's electrolyzers associated with the users.

Assuming that Fairlie et al. were combined with Shabana et al., the result would be a hydrogen production and distribution network to fill compressed gas hydrogen storage media 40 and 42 shown in Shabana et al. As such, the resulting combination would not disclose a manifold having a flow control network to allow a fuel cell to draw hydrogen from an auxiliary hydrogen site that can be independently renewed without utilizing the hydrogen from the main hydrogen storage site as called for in claim 1. Such combination would also not disclose the claim 7 method of supplying hydrogen wherein the hydrogen is supplied to the fuel cell to generate electricity to power a load and a further part of the hydrogen is supplied to the fuel cell on a scheduled basis from an auxiliary hydrogen storage site that is periodically renewed. Consequently, even if the Shabana et al. and Fairlie et al. references were combined they would not meet the terms of Applicants' invention as recited in either of independent claims 1 and 7.

Furthermore, Applicants disagree with the Examiner that it would be obvious to combine the two references. Shabana et al. discloses a supply

system for a vehicle which has multiple different sources of hydrogen can be readily used. Fairlie et al. discloses a network in which hydrogen is supplied in hydrogen storage sources themselves. Consequently, the Examiner is modifying Shabana et al. to have a flow control network, for instance, between compressed gas storage tanks where there is no such network to begin with or even any disclosed advantage of having the same. The Fairlie et al. network would operate between hydrogen generation stations, electrolyzers, and users. As such, as far as can be understood by Applicants, here the Examiner is picking and choosing isolated features of the references in an attempt to meet the elements of Applicants' invention as recited in claims 1 and 7 without any hint or teaching in either of the references or anywhere else to make such a combination. Hence, Applicants submit the rejection of claims 1 and 7 on the basis of Shabana et al. in view of Fairlie et al. improper in the first instance does not render such claims unpatentable.

The Examiner next rejected claims 1-5 and 7-10 under 35 U.S.C. §103(a) as being unpatentable over Shabana et al. in view of Manning et al.

Applicants repeat the statements above with respect to the applicability of Shabana et al. to the pending claims 1-5 and 7-10. Manning et al. adds nothing, however, to render Applicants' invention unpatentable. Manning et al. discloses a method to feed a gas stream compressed in an initial compression stage 12 into a lower pressure storage bank 20. The gas is then compressed from the lower pressure storage bank 20 in a final compression stage 30 to a higher pressure bank 24. When a vehicle 2 is to be filled, the gas from the higher pressure bank 24 feeds the vehicle tank until the pressure equalizes. At such point, the final compression stage 30 compresses the remaining gas in the higher pressure bank 24 to vehicle 2 as necessary to complete the filing process. Consequently, if Manning et al. were combined with Shabana et al., the compression system disclosed in Manning et al. would be used to fill the

compressed gas cylinder of hydrogen storage media 40 and 42 with compressed gas. Again, such combination would not disclose a manifold having a flow control network to allow a fuel cell to draw hydrogen from an auxiliary hydrogen site that can be independently renewed without utilizing the hydrogen from the main hydrogen storage site as called for in claim 1. Such combination would also not disclose the claim 7 method of supplying hydrogen wherein the hydrogen is supplied to the fuel cell to generate electricity to power a load and a further part of the hydrogen is supplied to the fuel cell on a scheduled basis from an auxiliary hydrogen storage site that is periodically renewed.

Applicants also submit that the combination is improper in the first instance and does not in any manner render Applicants' invention as recited in claim 1 and claim 7 obvious given the fact that Shabana et al. discloses a system in which a vehicle can use fuels from a variety of different sources and while Manning et al. has a flow control network, such network is being used to supply hydrogen to the storage tank that would be carried onboard the vehicle. Here, the Examiner is picking and choosing features of Manning et al. and utilizing them in Shabana et al. without any disclosure in either of the references or anywhere else to make such combination. As such, the combination of Shabana et al. and Manning et al. would not render Applicants' invention as recited in claims 1 and 7 obvious.

Given the fact that claims 1 and 7 are in allowable form, Applicants submit that the dependent claims 2-6 and 8-10 should be allowable on the same basis. As such, the Examiner's rejections of claims 2 and 8 under 35 U.S.C. §103(a) as being unpatentable over Shabana et al. and or Shabana et al. in view of Fairlie et al. or Shabana et al. in view of Manning et al. as applied to claims 1 and 7 and further in view of Japanese Publication JP 04-115470 is rendered moot.

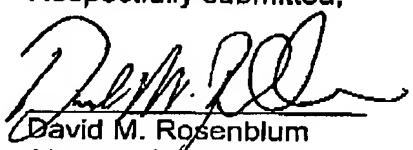
The Examiner also rejected claim 6 under 35 U.S.C. §103(a) as being unpatentable over Shabana et al. and/or Shabana et al. in view of

Fairlie et al. and/or Shabana et al. in view of Manning and/or Shabana et al. further in view of the Japanese Publication JP 04-115470 and further in view of McAlister. Applicants submit that since claims 1 and 7 are in allowable form and claim 6 depends on claim 1, then claim 6 should be allowable on the same basis as claim 1 and therefore this rejection is rendered moot.

Applicants are aware that this response is being made in the third month. Therefore, Applicants have submitted herewith a petition to extend the time to answer together with direction to charge the Assignee's deposit account in the appropriate fee.

In view of the remarks set forth above, reconsideration of the rejection and the allowance of all presently pending claims is requested. Since the claims are in condition for allowance, prompt and favorable action is hereby solicited.

Respectfully submitted,



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